NRC FORM 618
(8-2000)
10 CFR 71

U.S. NUCLEAR REGULATORY COMMISSION

CERTIFICATE OF COMPLIANCE
FOR RADIOACTIVE MATERIAL PACKAGES

1 a. CERTIFICATE NUMBER	b. REVISION NUMBER	c. DOCKET NUMBER	d. PACKAGE IDENTIFICATION NUMBER	PAGE	PAGES
9251	13	71-9251	USA/9251/AF	1	3

2. PREAMBLE

a. This certificate is issued to certify that the package (packaging and contents) described in Item 5 below meets the applicable safety standards set forth in Title 10, Code of Federal Regulations, Part 71, "Packaging and Transportation of Radioactive Material."

b. This certificate does not relieve the consignor from compliance with any requirement of the regulations of the U.S. Department of Transportation or other applicable regulatory agencies, including the government of any country through or into which the package will be transported.

3. THIS CERTIFICATE IS ISSUED ON THE BASIS OF A SAFETY ANALYSIS REPORT OF THE PACKAGE DESIGN OR APPLICATION

a. ISSUED TO *(Name and Address)*

AREVA NP, Inc.
P.O. Box 10935
Lynchburg, VA 24506-0935

b. TITLE AND IDENTIFICATION OF REPORT OR APPLICATION

AREVA NP, Inc., application dated September 13, 2007.

4. CONDITIONS

This certificate is conditional upon fulfilling the requirements of 10 CFR Part 71, as applicable, and the conditions specified below.

5.

(a) Packaging

(1) Model No.: BW-2901

(2) Description

A shipping container for low-enriched uranium oxide powder and pellets, composed of an inner container, surrounded by insulating material, and an outer drum. The inner cross sectional dimensions of the inner container are a maximum 11.15-inch square by 29.5-inch long. The inner container is constructed of minimum 14-gauge steel, with bolted and gasketed top flange closure and welded bottom sheet. The inner container is centered and supported in an 18-gauge steel drum with 16-gauge head and DOT Specification 17H or an equivalent DOT UN1A2/Y1.5/100 closure by asbestos or ceramic sheet, plywood, hardboard, and insulating material. The drum is approximately 22-1/2 inches in diameter and either 34-1/4 inches or 35-1/2 inches in overall height. The drum lid is closed with a 12-gauge locking ring with drop forged lugs and a 5/8-inch diameter bolt. In addition to the locking ring, three lid clamps are installed to secure the drum lid. The uranium oxide is packaged in boxes, and wood boards position the boxes within the inner container. Three borated aluminum plates (approximately 25 inches by 9.25 inches by 0.375 inch) are positioned within the inner container. The maximum gross weight of the package is 660 pounds.

(3) Drawings

The packaging is constructed in accordance with B&W Fuel Company Drawing Nos. 1215597D, Rev. 5; 1215598B, Rev. 1; 1215599E, Rev. 5; and AREVA NP, Inc., Drawing No. 12155600, Rev. 7.

5. (b) Contents

(1) Type and form of material

(i) Sintered uranium oxide pellets enriched to a maximum 5.05 weight percent U-235. The minimum pellet diameter is 0.315 inch, and the maximum pellet diameter is 0.400 inch.

(ii) Uranium dioxide as powder, pellets, or any combination thereof, enriched to a maximum 5.05 weight percent U-235.

(2) Maximum quantity of material per package

370 pounds, with the U-235 content not to exceed 7.47 kg. The maximum weight of the uranium oxide, pellet boxes, and all packaging materials within the inner container is 427 pounds. Uranium oxide must be packaged in accordance with B&W Fuel Company Drawing Nos. 1215597D, Rev. 5, and AREVA NP, Inc., Drawing No. 1215600, Rev. 7. The maximum mass of polyethylene within the inner container shall not exceed 1000 grams per package. Maximum quantity of radioactive material within a package may not exceed a Type A quantity.

5. (c) Criticality Safety Index (CSI) 0.7

6. Each package must be shipped with borated aluminum plates positioned within the inner container, on the top of, between, and on the bottom of the rows of pellet boxes. The three borated plates must have dimensions and boron concentration, and must be positioned in accordance with B&W Fuel Company Drawing No. 1215597D, Rev. 5.

7. For packages with fewer than six pellet boxes, solid aluminum or wood pellet box spacers must be substituted for pellet boxes. The pellet boxes, pellet box spacers, borated plates, and wood boards must provide a snug axial and cross sectional fit in the inner container.

8. In addition to the requirements of Subpart G of 10 CFR Part 71;

(a) Each packaging must be maintained and acceptance tested in accordance with Chapter 8 of the application;

(b) The package must be prepared for shipment and operated in accordance with the Operating Procedures of Chapter 7 of the application; and

(c) Prior to each shipment the insert (containment vessel) gasket shall be inspected. The gasket shall be replaced if it is damaged, defective, or degraded.

9. Transport of fissile material by air is not authorized.

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10. The package authorized by this certificate is hereby approved for use under the general license provisions of 10 CFR §71.17, provided that fabrication of the package was satisfactorily completed by April 1, 1999.

11. Revision No. 12 of this certificate may be used until January 31, 2009.

12. Expiration date: January 31, 2013.

REFERENCES

AREVA NP, Inc., application dated September 13, 2007.

FOR THE U.S. NUCLEAR REGULATORY COMMISSION

Robert A. Nelson, Chief
Licensing Branch
Division of Spent Fuel Storage and Transportation
Office of Nuclear Material
Safety and Safeguards

Date: January 24, 2008

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

SAFETY EVALUATION REPORT
Model No. BW-2901 Shipping Package
Certificate of Compliance No. 9251
Revision No. 13

SUMMARY

By application dated September 13, 2007, AREVA NP, Inc., (formerly Framatome ANP, Inc.) requested an amendment to and renewal of Certificate of Compliance No. 9251, for the Model No. BW-2901 package. AREVA requested changes in the specification for the uranium dioxide fuel pellets, and provided updated packaging drawings, package operations, and packaging maintenance.

Based on the statements and representations in the application, and the conditions described below, the staff concluded that the package meets the requirements of 10 CFR Part 71. The Certificate of Compliance has been amended as requested by the applicant, and has been renewed for a 5-year term that expires on January 31, 2013.

EVALUATION

By application dated September 13, 2007, AREVA requested the following changes to Certificate of Compliance No. 9251, for the Model No. BW-2901 package:

- Increase the maximum uranium dioxide fuel pellet diameter from 0.375 inch to 0.400 inch.
- Update one packaging drawing that shows the method for packaging fuel pellets.
- Update package operations and the packaging maintenance program described in Sections 7.0 and 8.0 of the application.

AREVA also requested that the Certificate be renewed. To support the request AREVA provided a consolidated application for the package in accordance with 10 CFR 71.38(c). The consolidated application included a new packaging drawing to replace an outdated one, and included replacements for Sections 7.0 and 8.0 of the application. The application also included a new section that evaluated the criticality safety of fuel pellets with a larger pellet diameter than previously evaluated. The additional criticality analyses also included a new description of the code validation for the SCALE 4.4a code, which was used for the analysis.

NRC staff reviewed the application using the guidance in NUREG 1609, "Standard Review Plan for Transportation Packages for Radioactive Material." This Safety Evaluation Report documents the review, and is written using the main section numbers from NUREG-1609.

1.0 General Information

1.1 Packaging

The BW-2901 is designed for the transport of low-enriched uranium oxide powder and pellets. The package is composed of an inner container, surrounded by insulating material, and an outer drum. The inner container (the containment vessel) is a steel vessel with a square cross section of 11.15-inches maximum, and a length of 29.5 inches. The drum is about 22.5 inches

in diameter and 34 inches high. The lid closure is a typical locking ring, with lugs that are bolted together. In addition, three lid clamps are installed to secure the drum lid. The uranium oxide is packaged in boxes, and wood boards position the boxes within the inner container. Three borated aluminum plates are positioned within the inner container to act as neutron absorbers. The maximum gross weight of the package is 660 pounds.

1.2 Drawings

The applicant provided a new drawing for the packaging: AREVA NP, Inc., Drawing No. 1215600, Rev. 7, "Method of Packaging UO2 Fuel Pellets." This drawing shows the configurations of cardboard boxes, pellet trays, polyethylene wrapping, and liners that may be used as secondary packaging for the uranium dioxide pellets. Several optional configurations are shown. The drawing replaces B&W Fuel Company Drawing No. 1283759D, Rev. 0.

The replacement drawing is considered acceptable, since it reflects essentially the same information as the replaced drawing, and does not change the approved shipping configurations. Condition No. 5(a)(3) of the certificate has been revised to include the replacement drawing.

6.0 Criticality

The applicant provided supplementary criticality analyses (Section 6.7 of the application) to support the requested change in the maximum pellet diameter (from 0.375 inch to 0.400 inch). The applicant considered a single package in isolation, an array of undamaged packages under normal conditions of transport, and an array of damaged packages under hypothetical accident conditions.

The applicant had previously shown that the limiting analyses were for an array of damaged packages under hypothetical accident conditions, including optimum moderation inside the containment system. The applicant had also shown that, for the range of pellet diameters previously considered, the maximum k-eff of the array was higher for the smaller diameter pellets. The current analysis confirmed that the k-eff for the 0.400-inch diameter pellets was lower than that calculated for smaller diameter pellets. The maximum k-eff for the 0.400-inch diameter pellets was 0.9225, whereas the maximum k-eff for the optimum pellet diameter (0.200-inch) was 0.9272.

The applicant provided an additional benchmarking evaluation for the computer code used in the new analysis (SCALE 4.4a). The evaluation resulted in an Upper Subcritical Limit (USL) of 0.94. The applicant showed that the results of the criticality analyses for the increased pellet diameter were within the USL. In addition, the applicant provided supplemental analyses for the smaller pellet diameters that confirm that the maximum k-eff for the complete range of pellet sizes was within the USL. The staff reviewed the supplemental criticality analysis and benchmark evaluation and found them to be adequate.

The staff performed confirmatory calculations for the revised pellet sizes using SCALE 5. The staff results confirmed those of the applicant. Condition No. 5(b)(1)(i) of the Certificate of Compliance has been revised to show a maximum pellet diameter of 0.400 inch.

The applicant did not request air transport for the package and did not provide a criticality assessment per the requirements of 10 CFR 71.55(f). This provision became effective on October 1, 2004, and applies to fissile material packages that are transported by air. Condition

No. 9 has been added to the Certificate to clarify that air transport of fissile material is not authorized.

7.0 Package Operations

The applicant provided an updated section describing package operations. The updated operations included confirmation that the contents were consistent with the limits provided in the Certificate of Compliance, including allowable pellet diameters. Editorial changes were made throughout Section 7. The staff reviewed the updated package operations and found them to be adequate.

8.0 Acceptance Tests and Maintenance Program

The applicant provided an updated section describing the acceptance tests and maintenance program for the packaging. Section 8.1 notes that fabrication of new packagings is not authorized per 10 CFR 71.19. The Certificate has been revised to clarify that use of the package under the General License in 10 CFR 71.17 is limited to packagings fabricated prior to April 1, 1999, as specified in 10 CFR 71.19(b). Section 8.3 provides the maintenance program, which includes visual inspections for exposed surfaces prior to each shipment. This maintenance program is considered adequate.

CONCLUSIONS

The following revisions were made to the Certificate:

- The Certificate holder was changed to AREVA NP, Inc. (formerly Framatome ANP, Inc.).
- The packaging description (Condition No. 5(a)(2)) was revised to clarify the dimensions of the drum.
- The updated packaging drawing showing the methods for packaging pellets was included, and the superseded drawing was removed (Condition No. 5(a)(3)).
- The maximum pellet diameter was increased from 0.375 inch to 0.400 inch (Condition No 5(b)(1)(i)).
- The term Transport Index for Criticality Control was changed to Criticality Safety Index (CSI) consistent with 10 CFR 71.4 and 71.59 (Condition No. 5(c)).
- Condition No. 9 was added to clarify that fissile material is not authorized for air transport, since the package was not evaluated per the requirements of 10 CFR 71.55(f).
- Condition No. 10 of the Certificate was revised to clarify that fabrication of the package was satisfactorily completed by April 1, 1999, as required by 10 CFR 71.19(b).
- Condition No. 11 was added that allows the previous revision of the certificate to be used for a period of approximately 1 year.
- The certificate was renewed, and the expiration date was changed to January 31, 2013 (Condition No. 12).

Based on the statements and representations in the application, and the conditions described above, the staff agrees these changes do not affect the ability of the package to meet the requirements of 10 CFR Part 71.

Issued with Certificate of Compliance No. 9251,
Revision No. 13, on January 24, 2008.